IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in

the application. An identifier indicating the status of each claim is provided.

Listing of Claims:

1. (Currently Amended) An image processing apparatus operable to embed data

into an image, said image comprising a frame of image data, said frame comprising first and

second image fields generated from an inter-laced scan of the image, said apparatus comprising:

a combining processor operable to represent said data to be embedded in a

transform domain form, and, in combination with a transform processor, to combine said data to

be embedded with at least one of said first and second fields of said image in one of:

a transform domain form, said transform processor generating a transform

domain form of said first and second fields, said data being combined with said first and second

fields by said combining processor in said transform domain, or

a spatial domain form of said at least one of said first and second fields,

said transform processor generating a spatial domain representation of said transform domain

form of said data to be embedded, said data being combined with said at least one of said first

and second fields of said image by said combining processor in said spatial domain,

wherein said transform domain provides a plurality of sub-bands and said

~~data to be embedded is introduced into at least one of said sub-bands of said at least one of said~~

~~first and second fields of said image~~ combining processor is operable to combine data to be

embedded with a first sub-band of said first field, and to combine said data with a second sub-

band of said second field of said image data in said transform or said spatial domain, and

wherein said first sub-band and said second sub-band comprise mutually

exclusive spatial frequency components.

2. (Canceled)

3. (Canceled)

4. (Original) An image processing apparatus as claimed in Claim 2, wherein said

data embedded in said first sub-band includes first data and said data embedded in said second

sub-band includes second data, said first and second data being different.

5. (Currently Amended) An image processing apparatus as claimed in ~~Claim 2~~

Claim 1, wherein said data embedded in said first sub-band and said data embedded in said

second sub-band are the same data.

6. (Original) An image processing apparatus as claimed in Claim 1, wherein said

first sub-band in which said data is introduced into said first and second fields represents in said

transform domain low spatial frequencies of said image in one direction and high spatial

frequencies of said image in another direction, and

said second sub-band in which said data is introduced in said image frame

represents in the transform domain high spatial frequencies of said image in said one direction

and low spatial frequencies of said image in said another direction.

00325695

7. (Previously Presented) An image processing apparatus as claimed in Claim 1, wherein said transform processor is operable in combination with said combining processor to introduce said data to be embedded into said image in accordance with the wavelet transform, of at least one of said data, said image frame and said at least one of said first and second fields, said wavelet transform providing said plurality of sub-bands.

8. (Original) An image processing apparatus as claimed in Claim 7, wherein said first sub-band into which said data is introduced into said at least one of said first and second fields has one of low vertical, high horizontal frequencies and high vertical, low horizontal frequencies sub-bands, and said second sub-band into which said data is introduced into said image frame is the other of said low vertical, high horizontal frequencies and high vertical, low horizontal frequencies sub-bands.

9. (Original) An image processing apparatus as claimed in Claim 8, wherein said data is introduced into said sub-bands in a scan direction, said scan direction being in the same direction in the sub-band as the direction of the low spatial frequencies of the image.

10. (Previously Presented) An image processing apparatus as claimed in Claim 1, comprising:

a modulator operable to modulate a Pseudo Random Symbol Stream with each of the data symbols to be embedded,

said modulated Pseudo Random Symbol Stream being introduced into said transform domain representation.

11. (Original) An image processing apparatus as claimed in Claim 1, wherein said data is formed into first and second data sets, and said combining processor is operable to introduce said first and second data sets into said at least one of said first and second image fields of said image frame respectively.

12. (Original) An image processing apparatus as claimed in Claim 11, wherein said data comprises data items, each data item and a copy of said each data item forming said first and said second data sets respectively.

13. (Currently Amended) An image processing apparatus as claimed in Claim 12, wherein said data items to be embedded include ~~meta data such as~~ a Unique Material Identifier (UMID).

14. (Previously Presented) An image processing apparatus operable to detect and recover data embedded into an image by the image processing apparatus according to Claim 1, said apparatus comprising:

a data processor operable to identify at least one of first and second fields of said image into which data has been embedded;

a transform processor operable to generate a transform domain representation of said at least one of the first and second fields into which the data has been embedded; and

00325695

a data detector operable to detect and recover the data from said transform domain

representation of said at least one of the first and second fields from the sub-bands into which the

data has been embedded.

15. (Original) An image processing apparatus as claimed in Claim 14, wherein

said data detector is operable to combine first signals representative of the first data set recovered

from said sub band in said image fields, with second signals representative of the second data set

from said other sub-band in said image frame to form a composite signal from which said data

items are recovered.

16. (Currently Amended) A method of embedding data into an image, said image

comprising a frame of image data, said frame comprising first and second image fields generated

from an inter-laced scan of the image, said method comprising:

representing said data to be embedded in a transform domain form;

combining said data to be embedded with at least one of said first and second

fields of said image in one of:

a transform domain form, said data being combined with said first and

second fields in said transform domain, or

a spatial domain form of said at least one of said first and second fields, by

generating a spatial domain representation of said transform domain form of said data to be

embedded, said data being combined with said at least one of said first and second fields of said

image in said spatial domain,

wherein said transform domain provides a plurality of sub-bands and said ~~data to be embedded is combined into at least one of said sub-bands, said data being combined with said at least one of said first and second fields of said image in said sub-band of said fields~~ combining comprises combining data to be embedded into a first sub-band of a transform domain representation of said first field and combining said data with a second sub-band of said second field of said image data in said transform or said spatial domain,

wherein said first sub-band and said second sub-band comprise mutually exclusive frequency components.

17. (Canceled)

18. (Previously Presented) A method of detecting and recovering data embedded in an image by the image processing method according to claim 16, said method further comprising:

identifying at least one of first and second fields of said image into which data has been embedded;

generating a transform domain representation of said at least one of the first and second fields into which the data has been embedded; and

detecting and recovering the data from said transform domain representation of said at least one of the first and second fields from the sub-bands into which the data has been embedded.

19.   (Currently Amended) An apparatus for embedding data into an image, said image comprising a frame of image data, said frame comprising first and second image fields generated from an inter-laced scan of the image, said apparatus comprising:

means for representing said data to be embedded in a transform domain form;

means for combining said data to be embedded with at least one of said first and second fields of said image in one of:

a transform domain form, said data being combined with said first and second fields in said transform domain, or

a spatial domain form of said at least one of said first and second fields, by generating a spatial domain representation of said transform domain form of said data to be embedded, said data being combined with said at least one of said first and second fields of said image in said spatial domain,

wherein said transform domain provides a plurality of sub-bands and said data to be embedded is combined by said combining means into at least one of said sub-bands, said data being combined with said at least one of said first and second fields of said image in said sub-band of said fields means for combining is operable to combine data to be embedded with a first sub-band of said first field, and to combine said data with a second sub-band of said second field of said image data in said transform or said spatial domain, and

wherein said first sub-band and said second sub-band comprise mutually exclusive spatial frequency components.

20. (Previously Presented) An apparatus for detecting and recovering data embedded in an image by the apparatus according to claim 19, said apparatus further comprising:

means for identifying at least one of first and second fields of said image into

which data has been embedded;

means for generating a transform domain representation of said at least one of the

first and second fields into which the data has been embedded; and

means for detecting and recovering the data from said transform domain

representation of said at least one of the first and second fields from the sub-bands into which the

data has been embedded.

21. (Original) A signal representing an image in which data has been embedded

by an image processing apparatus according to Claim 1.

22. (Original) A computer program providing computer executable instructions,

which when loaded on to a data processor configures said data processor to operate as an image

processing apparatus as claimed in Claim 1.

23. (Original) A computer program having computer executable instructions,

which when loaded on to a data processor causes the data processor to perform the method

according to Claim 16.

24. (Original) A computer program product having a computer readable medium

having recorded thereon information signals representative of the computer program claimed in

Claim 22.

00325695

25. (Original) A computer program product having a computer readable medium

having recorded thereon information signals representative of the computer program claimed in

Claim 23.

26. (New) An image processing apparatus operable to embed data into an image,

said image comprising a frame of image data, said frame comprising first and second image

fields generated from an inter-laced scan of the image, said apparatus comprising:

a combining processor operable to represent said data to be embedded in a

transform domain form, and, in combination with a transform processor, to combine said data to

be embedded with at least one of said first and second fields of said image in one of:

a transform domain form, said transform processor generating a transform

domain form of said first and second fields, said data being combined with said first and second

fields by said combining processor in said transform domain, or

a spatial domain form of said at least one of said first and second fields,

said transform processor generating a spatial domain representation of said transform domain

form of said data to be embedded, said data being combined with said at least one of said first

and second fields of said image by said combining processor in said spatial domain,

wherein said transform domain provides a plurality of sub-bands, said data to be

embedded being introduced into at least one of said sub-bands of said at least one of said first

and second fields of said image,

wherein said transform processor is operable in combination with said combining

processor to introduce said data to be embedded into said image in accordance with the wavelet

transform, of at least one of said data, said image frame and said at least one of said first and second fields, said wavelet transform providing said plurality of sub-bands,

wherein said first sub-band into which said data is introduced into said at least one of said first and second fields has one of low vertical, high horizontal frequencies and high vertical, low horizontal frequencies sub-bands, and said second sub-band into which said data is introduced into said image frame is the other of said low vertical, high horizontal frequencies and high vertical, low horizontal frequencies sub-bands,

wherein said data is introduced into said sub-bands in a scan direction, said scan direction being in the same direction in the sub-band as the direction of the low spatial frequencies of the image.

27. (New) An image processing apparatus as claimed in claim 26, wherein said combining processor is operable to combine data to be embedded with a first sub-band of said first field, and to combine said data with a second sub-band of said second field of said image data in said transform or said spatial domain.

28. (New) An image processing apparatus as claimed in claim 27, wherein said first sub-band and said second sub-band comprise mutually exclusive spatial frequency components.

29. (New) An image processing apparatus as claimed in claim 27, wherein said data embedded in said first sub-band includes first data and said data embedded in said second sub-band includes second data, said first and second data being different.

00325695

30. (New) An image processing apparatus as claimed in claim 27, wherein said data embedded in said first sub-band and said data embedded in said second sub-band are the same data.

31. (New) An image processing apparatus as claimed in claim 26, wherein said first sub-band in which said data is introduced into said first and second fields represents in said transform domain low spatial frequencies of said image in one direction and high spatial frequencies of said image in another direction, and

said second sub-band in which said data is introduced in said image frame represents in the transform domain high spatial frequencies of said image in said one direction and low spatial frequencies of said image in said another direction.

32. (New) An image processing apparatus as claimed in claim 26, comprising:

a modulator operable to modulate a Pseudo Random Symbol Stream with each of the data symbols to be embedded,

said modulated Pseudo Random Symbol Stream being introduced into said transform domain representation.

33. (New) An image processing apparatus as claimed in claim 26, wherein said data is formed into first and second data sets, and said combining processor is operable to introduce said first and second data sets into said at least one of said first and second image fields of said image frame respectively.

00325695

34. (New) An image processing apparatus as claimed in claim 33, wherein said data comprises data items, each data item and a copy of said each data item forming said first and said second data sets respectively.

35. (New) An image processing apparatus as claimed in claim 34, wherein said data items to be embedded include a Unique Material Identifier (UMID).

36. (New) An image processing apparatus operable to detect and recover data embedded into an image by the image processing apparatus according to claim 26, said apparatus comprising:

a data processor operable to identify at least one of first and second fields of said image into which data has been embedded;

a transform processor operable to generate a transform domain representation of said at least one of the first and second fields into which the data has been embedded; and

a data detector operable to detect and recover the data from said transform domain representation of said at least one of the first and second fields from the sub-bands into which the data has been embedded,

wherein said data detector is operable to combine first signals representative of the first data set recovered from said sub band in said image fields, with second signals representative of the second data set from said other sub-band in said image frame to form a composite signal from which said data items are recovered.

00325695

37. (New) A method of embedding data into an image, said image comprising a frame of image data, said frame comprising first and second image fields generated from an inter-laced scan of the image, said method comprising:

representing said data to be embedded in a transform domain form;

combining said data to be embedded with at least one of said first and second fields of said image in one of:

a transform domain form, said data being combined with said first and second fields in said transform domain, or

a spatial domain form of said at least one of said first and second fields, by generating a spatial domain representation of said transform domain form of said data to be embedded, said data being combined with said at least one of said first and second fields of said image in said spatial domain,

wherein said transform domain provides a plurality of sub-bands and said data to be embedded is combined into at least one of said sub-bands, said data being combined with said at least one of said first and second fields of said image in said sub-band of said fields,

said method comprises combining data to be embedded into a first sub-band of a transform domain representation of said first field; and

combining said data with a second sub-band of said second field of said image data in said transform or said spatial domain,

wherein said combining includes introducing said data to be embedded into said image in accordance with the wavelet transform, of at least one of said data, said image frame and said at least one of said first and second fields, said wavelet transform providing said plurality of sub-bands,

wherein said first sub-band into which said data is introduced into said at least one

of said first and second fields having one of low vertical, high horizontal frequencies and high

vertical, low horizontal frequencies sub-bands, and said second sub-band into which said data is

introduced into said image frame being the other of said low vertical, high horizontal frequencies

and high vertical, low horizontal frequencies sub-bands,

wherein said data being introduced into said sub-bands in a scan direction, said

scan direction being in the same direction in the sub-band as the direction of the low spatial

frequencies of the image.

38. (New) A signal representing an image in which data has been embedded by an

image processing apparatus according to claim 26.

39. (New) A computer program product providing computer executable

instructions, which when loaded on to a data processor configures said data processor to operate

in accordance with the method according to claim 37.

00325695